Radiochemical Processing Laboratory supports vitrification

While construction work continues on the massive Waste Treatment Plant that will vitrify Hanford's highly radioactive tank waste, a miniature research version of the plant is already in operation in Hanford's Radiochemical Processing Laboratory in Hanford's 300 Area.

Battelle - Pacific Northwest Division is one of several laboratories tasked with providing data to support the design of the WTP to ensure that the waste glass produced by the plant meets appropriate criteria for disposal. The high-activity portion of the tank waste will be sent off site to a repository, while the low-activity portion will remain at Hanford for disposal.

"When the waste samples arrive in our facility for our experiments and testing, we mix them to ensure they are homogeneous, then run them through all of the processes that will be used in the WTP to prepare the waste for disposal," said Dean Kurath, who heads the project for Battelle.

John Geeting of Pacific Northwest National Laboratory works with test apparatus known as a cell unit filter, which is used to separate solids and liquids in tank-waste samples. This apparatus is an example of one of the components of the miniature research version of the Waste Treatment Plant housed in the Radiochemical Processing Laboratory, where researchers are working to provide data to support the design of the WTP.

The miniature RPL process is a batch simulation of the continuous-feed process to be used in the full-scale plant. The process begins with washing high-level waste sludges to remove various metals such as aluminum and chromium because they limit the volume of waste that can be mixed with the glass. This mixture is then run through a cross-flow filtration step that is set up in one of the RPL hot cells to separate solids and liquids. Isotopes of cesium and strontium are also removed, along with other isotopes. Once the pretreatment is completed, the samples are mixed with glass-forming chemicals and sent to the RPL's miniature melter. From there, the vitrified samples are poured into molds and tested to make sure they meet WTP criteria.

"The goal is cost-effective disposal of Hanford's waste in a responsible manner. The processes that we have developed will help reduce waste volume and ensure safe, long-term disposal," Kurath said.

Our scientists have been working on tank- waste issues for over 25 years to help Hanford achieve its goals and we are enthusiastic because we are part of the final solution," said RPL manager Jim Buelt.

The Waste Treatment Plant Support Project is expected to run through 2006. ■